ADM 4354, Fall2015, Quiz #3

Name:_____

Student i.d.:_____

Please, write your answers in the space provided.
Only the final answer will be graded.

Problem 1 (1 point): Making an appropriate assumption about the validity of the parity conditions, find inflation rate in Canada if Canadian dollars has depreciated relative to USD by 10% and the inflation in the U.S. was 7%.

Answer: 19%

$\frac{S_0 \quad S_1}{\rightarrow}$

$\frac{S_1 - S_0}{S_0} = \frac{\pi - \pi^*}{1+\pi^*}$. If S is $\left(\frac{\$}{CAD}\right) \Rightarrow \pi = \pi^{\$}$, $\pi^* = \pi^{CAD}$

$-0.1 = \frac{0,07 - x}{1+x} \Rightarrow 0.1x + 0.1 = x - 0,07$

$0.17 = 0.9x$

$0.19 = x$ or $\pi^{CAD} = 19\%$

Problem 2 (1 point): Which of the following conditions is the WEAKEST condition that MUST be satisfied to allow you to answer the previous question?

a) The law of one price
b) Purchasing Power Parity
c) Relative Purchasing Power Parity
d) Interest Rate Parity

Problem 3 (1 point): Find U.K. interest rate if U.S. interest rate is 12%, spot \$/£ exchange rate 1.3\$/£ and 1-year forward exchange rate is 1.4\$/£

Answer:_____

$\frac{F}{S} = \frac{1+r}{1+r^*} \Rightarrow \frac{1.4 \frac{\$}{£}}{1.3 \frac{\$}{£}} = \frac{1+0.12}{1+x} \Rightarrow$

$\Rightarrow x = \frac{1.3 \cdot 1.12}{1.4} - 1 = 0.04$ or 4%

Problem 4 (1 point): Find the 1-year forward **£/$** exchange rate if the spot exchange rate is 0.8£/$, U.S. interest rate is 7% and U.K. interest rate is 4%. NOTE: please note that the exchange rate quotation in this problem is different from the previous one!

Answer:_____

$$\frac{F}{S} = \frac{1+r^*}{1+r} \Rightarrow \frac{F}{0.8\ \frac{£}{\$}} = \frac{1+0.04}{1+0.07} \Rightarrow$$

$$\Rightarrow F = \frac{0.8 \cdot 1.04}{1.07} = 0.78\ \frac{£}{\$}$$

Problem 5 (1 point): Find the MAXIMUM possible **U.S.** interest rate if you observe the spot bid-ask exchange rates of 1.28-1.32$/£, the 1-year forward bid-ask exchange rates of 1.38-1.42$/£, you can freely borrow £s at 13% and invest them at 11%

Answer:_____

$\frac{\$}{£}$ 1.28-1.32 | r | 1.38-1.42 $\frac{\$}{£}$

← 13% → 11%

$$\max r = \frac{\max F \cdot (1+\max r^*)}{\min S} - 1$$

$$= \frac{1.42 \cdot (1+0.13)}{1.28} - 1 = 0.25$$

or 25%

(Alternative solution involves writing a strategy: By starting by borrowing 1£ we'll be able to get profit of $\frac{1.28(1+r)}{1.42} - 1.13$, so for it to be < 0

$r < \frac{1.13 \cdot 1.42}{1.28} - 1$ note: same result)

Problem 6 (1 point): Find the MAXIMUM possible **U.K.** interest rate if you observe the spot bid-ask exchange rates of 1.28-1.32$/£, the 1-year forward bid-ask exchange rates of 1.38-1.42$/£, you can freely borrow $s at 13% and invest them at 11%

Answer:_____

$\frac{£}{\$}$ 1.28-1.32 | r* | 1.38-1.42 $\frac{£}{\$}$

← 13 → 11

$$\max r^* = \frac{\max S \cdot (1+\max r)}{\min F} - 1 = \frac{1.32 \cdot 1.13}{1.38} - 1$$

(Alternative solution involves writing a strategy: by borrowing 1$ at 13% we'll be able to get profit of $\frac{1+r^*}{1.32} \cdot 1.38 - 1.13$, so for it to be < 0, r^* has to be

$r^* < \frac{1.32 \cdot 1.13}{1.38} - 1$ same result)

Problem 7 (1 point): Assume that the interest parity condition between $ and £ is violated so that you can make an arbitrage and your arbitrage strategy include selling forward contracts on £. In this case your arbitrage strategy will also include:

a) Buying £s on the spot market and buying forward contracts on £s
b) Buying £s on the spot market and selling forward contracts on £s
c) Selling £s on the spot market and buying forward contracts on £s
d) Selling £s on the spot market and selling forward contracts on £s

Problem 8 (1 point): How the value of a European put option for £1 will change if the current exchange rate will instantly increase from 1.4 $/£ to 1.5$/£:

a) Increase by $0.1

b) Increase by an amount that cannot be determined based on the available information

c) Decrease by $0.1

d) Decrease by an amount that cannot be determined based on the available information

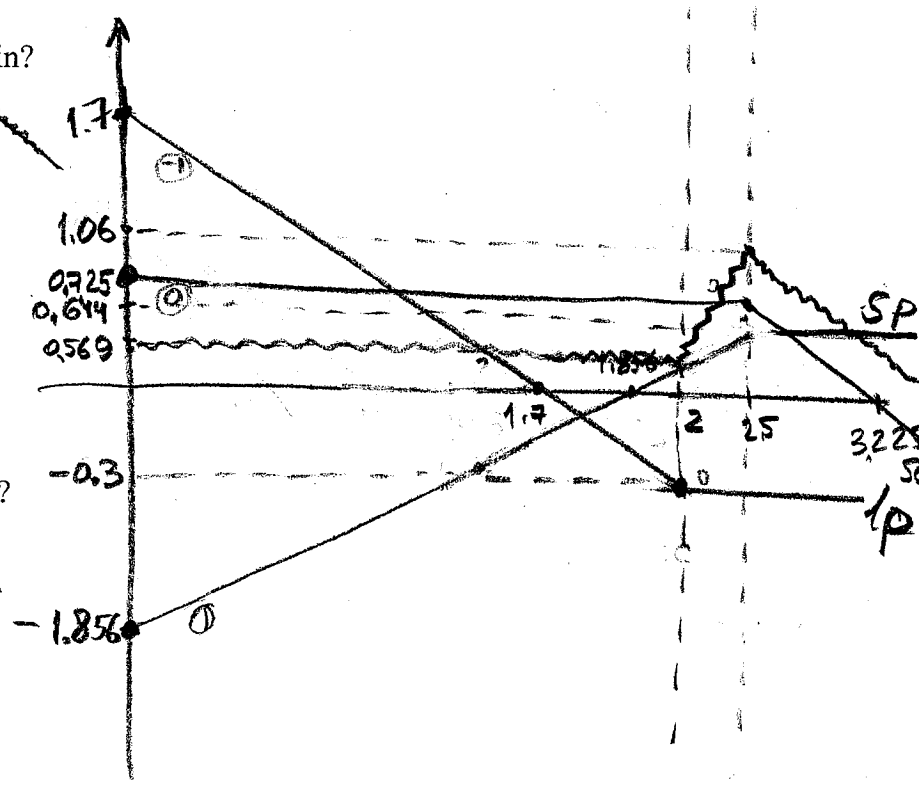
since we don't know how time value is affected

Problem 9 (2 points): Assume you bought one put option with strike price of 2$/£ for 0.3$, sold one call option with strike price of 2.5$/£ for 0.725$ and sold one put option with strike price of $2.5 for $0.644

a) What is your maximum possible gain?

Since profit's shape is ~~~ then max gain is achived at $S_T = 2.5$

at 2.5 ep: −0.3
sp: 0.644
sc: 0.725
Answer: Σ = 1.069



b) What is you maximum possible loss?

It is infinite (∞).
(look at ~~~)

Problem 10 (1 point): Consider a call option with a strike price of 1.7$/£. If the current exchange rate is 1.6$/£

a) This option is in the money if and only if its price is less than $0.1

b) This option is in the money if and only if its price is more than $0.1

c) This option is out of the money if and only if its price is less than $0.1

d) This option is out of the money if and only if its price is more than $0.1

e) This option is in the money regardless of its current price

f) This option is out of the money regardless of its current price

g) At least two of the above answers are correct

Problem 11 (1 point): Find the time value of a 1-year put option with strike price of 1.7$/£ if the current exchange rate is 1.5$/£, the option costs $0.5 and the domestic interest rate is 14%.

Answer:_____ Total value = Time value + Intr. value

0.5 = X 0.2 (1.7−1.5) put is ITM

⇒ Time value = 0.3

Problem 12 (1 point): An increase in foreign interest rate will lead to:
a) Higher call option price and higher put option price
b) Higher call option price and lower put option price
c) Higher call option price and no effect on the put option price
d) Lower call option price and higher put option price
e) Lower call option price and lower put option price
f) Lower call option price and no effect on the put option price
g) No effect on the call option price and higher put option price
h) No effect on the call option price and lower put option price
i) No effect on the call option price and no effect on the put option price

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Problem 13 (1 point): If one-year call and put options with the same strike price of 1.7$/£ have the same price of $0.4 and domestic interest rate is equal to 10%, then:
a) Foreign interest rate is equal to 10%
b) The spot exchange rate is equal to 1.7$/£
c) The forward exchange rate is equal to 1.7$/£
d) At least two of the above answers are correct
e) All of the above
f) None of the above

$C = P \Leftrightarrow F = X$

Problem 14 (1 point): Find the price of 1-year call option with strike price of 1.7$/£ if 1-year put option with the same strike sells for $0.4, forward exchange rate is 1.5$/£ and domestic interest rate is 8%

Answer:_____

Call put parity

$$C - P = \frac{F - X}{(1+r)^1}$$

$$C - 0.4 = \frac{1.5 - 1.7}{1.08}$$

$$C = 0.215$$